



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/566,755	02/01/2006	Peter Boehland	R305594	7324

2119 7590 01/26/2007
RONALD E. GREIGG
GREIGG & GREIGG P.L.L.C.
1423 POWHATAN STREET, UNIT ONE
ALEXANDRIA, VA 22314

EXAMINER

GIMIE, MAHMOUD

ART UNIT	PAPER NUMBER
----------	--------------

3747

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/26/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/566,755

Applicant(s)

BOEHLAND ET AL.

Examiner

Mahmoud Gimie

Art Unit

3747

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 February 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 18-337 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 18-26 and 29-37 is/are rejected.
- 7) ☒ Claim(s) 27 and 28 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 February 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 2/1/06.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 35-37 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim.

Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The dependent method claims 35-37 fail to further limit the parent apparatus claims 18 and 24.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

3. Claims 18-26 and 29-37 are rejected under 35 U.S.C. 102(e) as being anticipated by Boecking (US 2006/0144964 A1)

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Boecking discloses a fuel injection device (22) for an internal combustion engine, having at least two valve elements (36, 40), each of which has a hydraulic control surface (78, other not numbered) acting in the closing direction associated with a hydraulic control chamber (76,34), having a control valve (56) that influences the pressure in the control chamber (76, 34), and having loading devices (springs) that are able to act on the valve elements (36, 40) in the opening direction, in which the valve elements (36, 40) react at different hydraulic opening pressures prevailing in the control chamber (76, 34), the improvement wherein the control valve (56) is able to set at least three different pressure levels in the control chamber: wherein all of the valve elements are closed at a comparatively high pressure level; wherein one valve element is open at a medium pressure level; and wherein all of the valve elements are open at a comparatively low pressure level, see paragraphs 0035 to 0040.

Regarding claim 19, the control chamber is connected both to a high-pressure (106) connection via an inlet throttle (110) and the control valve (56) is connected both to the control chamber (76) and to a low-pressure connection (72).

Regarding claim 20, wherein the control valve (56) comprises a switching chamber (60) with a switching element (58), which rests against a first valve seat (88) leading to the low-pressure connection in a first switched position, rests against a second valve seat (not numbered) leading to a bypass conduit in a second switched position, in which position the bypass conduit is connected to the high-pressure connection, and does not rest against either the first valve seat or the second valve seat in a third switched position.

Regarding claim 21, wherein in the third switched position, the control valve constitutes a throttle that restricts the flow toward the low-pressure connection.

Regarding claim 22, wherein the control chamber (76) is connected to the high-pressure connection, the control valve is connected to the control chamber via at least two control conduits, and wherein the control valve disconnects all of the control conduits from a low-pressure connection in a first switched position, connects one control conduit to the low-pressure connection in a second switched position, and connects all of the control conduits to the low-pressure connection in a third switched position.

Regarding claim 23, wherein the control chamber (76) is connected to the high-pressure connection, the control valve is connected to the control chamber via at least two control conduits, and wherein the control valve disconnects all of the control conduits from a low-pressure connection in a first switched position, connects one control conduit to the low-pressure connection in a second switched position, and connects all of the control conduits to the low-pressure connection in a third switched position.

Art Unit: 3747

Regarding claim 24, wherein the control chamber (76) is connected to a high-pressure connection, wherein the control valve (56) connects the control chamber to a low-pressure connection in a first switched position (at 68) and disconnects the control chamber from it in a second switched position, and wherein it is possible to continuously switch the control valve back and forth between the first switched position and the second switched position.

Regarding claim 25, wherein it is possible to trigger the control valve so that the continuous changing causes the pressure in the control chamber to fluctuate around a medium pressure level.

Regarding claim 26, wherein it is **possible** to trigger the control valve quickly so that the continuous changing yields a substantially constant, and medium pressure level.

Regarding claim 29, wherein the control valve includes a piezoelectric actuator (64).

Regarding claim 30, wherein the control valve includes a piezoelectric actuator (64).

Regarding claim 31, wherein the control valve includes a valve body that is hydraulically coupled to the piezoelectric actuator (64); and wherein leakage fuel (return) emerging from a guide of at least one valve element is used as the hydraulic fluid.

Regarding claim 32, further comprising a catch on one valve element that acts on the other valve element in the opening direction.

Regarding claim 33, wherein the catch is embodied so that it strikes the other valve element shortly before the one valve element reaches its maximum stroke.

Regarding claim 34, wherein the loading device acting in the opening direction of the other valve element and the hydraulic control surface of the other valve element are

Art Unit: 3747

matched to each other so that this valve element opens only if the catch of the one valve element exerts an additional force acting in the opening direction.

Regarding claim 35, the method comprising the steps of first connecting the control chamber to a low-pressure connection and then, simultaneously connecting the control chamber to the low-pressure connection and a high-pressure connection in order to open only one valve element.

Regarding claim 36, the method comprising the steps of first connecting the control chamber to the low-pressure connection and then, additionally connecting the control chamber to the high-pressure connection in order to open only one valve element.

Regarding claim 37, the method comprising closing the relay valve shortly before the pressure in the control chamber has fallen far enough for the inner valve element to open, and opening the relay valve again shortly before the outer valve element closes.

Allowable Subject Matter

4. Claims 27 and 28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The cited references disclose high-pressure fuel injectors.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mahmoud Gimie whose telephone number is 571-272-

4841. The examiner can normally be reached on Monday-Friday between 7 a.m. -3:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen K. Cronin can be reached on 571-272-4536. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MG


MAHMOUD GIMIE
PRIMARY EXAMINER